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The DANSS neutrino spectrometer: the results of reactor antineutrino studies

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The DANSS detector is a movable neutrino spectrometer currently operating under one of industrial reactors of the Kalinin Nuclear Power Plant. Its plastic scintillator composition with no flammable or otherwise dangerous materials allows placing it close to the reactor core thus benefiting from ample antineutrino flux. Complex multilayers of the active and passive shielding and high segmentation of the sensitive volume makes it possible to reconstruct up to 5000 IBD events per day with residual cosmic background on the level of few percent. The data are recorded in three different positions from the center of the reactor core, which gives a great opportunity to search for short-range neutrino oscillations to a hypothetical sterile state in a wide range of mixing parameters.

In this talk the DANSS collaboration reports the results on short-range oscillations, which are obtained from the 2016-2019 data set comprising about three million IBD events. The dependence of the measured antineutrino spectrum on the nuclear fuel composition is also presented. Finally, the long-term measurements of the reactor power are discussed, illustrating the excellent DANSS capacity for independent high-precision monitoring of nuclear reactor.

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